CLAIMS

We claim:

1. An apparatus for depositing particles carried in moving air currents, which comprises:

a frame member;

a generally horizontal axle mounted for rotation on said frame member;

a plurality of blades secured to the horizontal axle for receiving and depositing such particles under the frame member and for rotatably moving with the axle caused by movement of the air currents and particles;

a plurality of vertically displaceable supporting members attached to and depending from the frame member;

lifting device associated with the frame member and each of the plurality of supporting members for vertically displacing each of the plurality of vertically displaceable supporting members; and

power transmission means operatively associated with said horizontal axle and each of the lifting devices for transferring the energy of rotation of the horizontal axle to each said lifting devices for causing the vertically displacement of each of the plurality of vertically displaceable supporting members;

whereby rotation of the horizontal axle by movement of the plurality of blades produces a periodic vertical displacement of each of the supporting members to lift the frame structure with respect to the deposited particles.

2. The apparatus of claim 1, wherein said plurality of blades includes at least two blades.

3. The apparatus of claim 1, wherein said at least two blades comprises a Savonius windmill.

4. The apparatus of claim 1, wherein said blades are rigid.

5. The apparatus of claim 1, wherein the surface of said blades is coated with an abrasion-resistant material such as polyvinyl chloride, hardened metal alloy or composite materials.

6. The apparatus of claim 1, wherein said blades are made of an abrasion resistant material such as plastic, or composite materials.

7. The apparatus of claim 1, which further comprises amplitude control means for controlling the stroke of the periodic vertical displacement of the supporting members.

8. The apparatus of claim 1, wherein said power transmission means includes a mechanical power train from said axle to each of said plurality of lifting devices.

9. The apparatus of claim 1, wherein said plurality of vertically displaceable supporting members includes four supporting members.

10. The apparatus of claim 1, which further comprises an articulated support plate attached to each of the plurality of supporting members.

11. The apparatus of claim 10, wherein said articulated support plates are attached to the free end of each said supporting members.

12. The apparatus of claim 10, wherein a plurality of such support plates are attached to the exterior surface of at least one of the plurality of supporting members.

13. The apparatus of claim 1, which further comprises signal transmission means operatively connected to said axle.

14. The apparatus of claim 1, wherein the free ends of said supporting members are positioned on the earth's surface, said horizontal axle being supported at a distance of about one meter above the surface and normal to the prevailing direction of air currents carrying suspended particles, whereby said frame member self-adjusts its vertical position to maintain said axle and blades above the deposited particles.

15. The apparatus of claim 1 wherein each said vertically displaceable supporting members comprises a guiding tube having a piston slidable therein, said slidable piston having a crank arm pivotably attached thereto, said crank arm being connected to said power transmission means to slidably move said piston upwardly and downwardly within said guiding tube, said piston having a leg member attached thereto on the side opposite said crank arm, said leg member having a foot attached to the free end thereof for engagement with the sand to support said frame member thereon.

16. The apparatus of claim 15, wherein said crank arm is replaceable by a crank arm of different length to vary the length of the stroke.

17. The apparatus of claim 15, wherein said crank arm includes a plurality of apertures for attachment to said power transmission means by a pin made to extend through a selected aperture and into said power transmission means.

18. The apparatus of claim 15, wherein said power transmission means comprises a pair of pulleys on each end of said axle, and a pair of drive belts are connected to said axle and said pulleys, said crank arm of each said supporting member being attached to said

pulleys at a selected radial location so as to move upwardly and downwardly when said pulleys rotate caused by energy transmitted by air currents and particles carried thereby.

19. The apparatus of claim 16 wherein said power transmission means comprises a pair of pulleys on each end of said axle, and a pair of drive belts are connected to said axle and said pulleys, said crank arm of each said supporting member being attached to said pulleys at a selected radial location so as to move upwardly and downwardly when said pulleys rotate caused by energy transmitted by air currents and particles carried thereby.

20. The apparatus of claim 18, wherein each said pulley is operated by a V-belt.

21. The apparatus according to claim 19, wherein the point of connection between each said crank arm and each said pulley is offset by 90 degrees from the point of connection of the next adjacent pulley.

22. An apparatus for depositing particles carried by moving arm current, which comprises:

a) a frame member;

b) a horizontal axle bearing mounted to said frame member for rotation;

c) at least two windmill blades attached to said axle to form a Savonius-type windmill for engagement by the air currents and for receiving and depositing such particles beneath said frame member, said windmill blades rotatably moving with said axle by energy imparted thereto by the air currents and particles carried thereby;

d) a plurality of vertically displaceable supporting members attached to said frame member and depending therefrom, each said supporting member including:

i) a guiding tube;

ii) a piston slidable upwardly and downwardly within said guiding tube;

iii) a crank arm attached to the upper portion of said piston; and

iv) a leg member attached to the lower portion of said piston, said leg member having a support foot attached to the lowermost free end thereof;

e) power transmission means adapted to convert energy from the wind currents and particles carried thereby to rotational movement of a plurality of pulleys, each said pulley having at least one of said crank arms attached thereto,

whereby rotation of said pulleys causes correspondingly rotation and upward and downward movement of each said crank arm to cause each said support leg and attached support foot to move upwardly and downwardly with a sand pile accumulated by said windmill to cause said frame member to periodically rise to maintain a position within a predetermined dimensional range at or near the top of the sand pile.

23. An apparatus for depositing particles carried in moving air currents, which comprises:

a frame member positionable on a surface and in the air currents at a predetermined height location above the surface;

a generally horizontal axle mounted for rotation on said frame member;

a plurality of windmill blades attached to said axle to form a Savonius-type windmill for engagement by air currents and for receiving and depositing and accumulating such particles beneath said frame member so as to progressively raise the level of the surface of such particles on which said frame member is positioned, said windmill blades rotatably

moving with said axle by energy imparted thereto by the air currents and particles carried thereby; and

means to maintain the height of said frame member with respect to the surface of such particles within a predetermined dimensioned range by progressively raising said frame member as such particles are deposited and accumulated.

24. The apparatus of claim 23, wherein said means to maintain the height of said frame member with respect to the surface of such particles comprises a plurality of vertically displaceable supporting member attached to and supporting said frame member, each said supporting member adapted to progressively raise said frame member in accordance with the level of the surface of such particles as such particles are accumulated beneath said frame member, to maintain the height of said frame member with respect to the upper surface of such particles within a predetermined range.

25. An apparatus for depositing sand particles carried by moving air currents, which comprises:

a frame member positionable on a surface and in the air currents at a predetermined height location above the surface;

a generally horizontal axle mounted for rotation on said frame member;

a plurality of windmill blades attached to said axle to form a savonius-type windmill for engagement by air currents and for stopping and depositing and accumulating such particles beneath said frame member so as to progressively raise the level of the surface of such particles on which said frame member is positioned;

a support device attached to and depending from said frame member at a predetermined number of locations sufficient to support said frame member in a stable manner, each said support device being capable of adjusting the position of the portion of said frame member from which it depends as the height level of accumulated particles thereunder increases; and

system for causing said support devices to adjust their positions with respect to the level of such accumulated particles in a manner to maintain the height location of said frame member within a predetermined range.

26. The apparatus according to claim 25, wherein said system for causing said support devices to adjust their positions with respect to the level of such accumulated particles comprises a power transmission system operatively associated with said longitudinal axle and said support devices for transferring the energy of rotation of the horizontal axle to each said support device for causing each said support device to adjust the position in the manner to maintain the height dimension of said frame member above the level of such accumulated particles within a predetermined range.

27. The apparatus according to claim 26, wherein said predetermined range is between about 3/4 to about 1 1/4 meter.

28. The apparatus according to claim 27, wherein said range is about one meter.

29. A method of stopping and depositing air-borne particles from air currents moving proximate a surface, comprising:

a. providing a self-adjusting Savonius windmill apparatus, the axle of which is mounted to a frame member equipped with a plurality of vertically displaceable supporting members; and

b. positioning the windmill apparatus on a surface and in the air currents with the axle normal to the prevailing direction of the air currents, whereby particles impacting the blades of the windmill are stopped and deposited and accumulated on the surface.

30. The method of claim 29, further comprising positioning a plurality of the windmill apparatus in a flanking array to thereby reduce the advancement of particles over an area of the surface downwind of the plurality of windmill apparatus.